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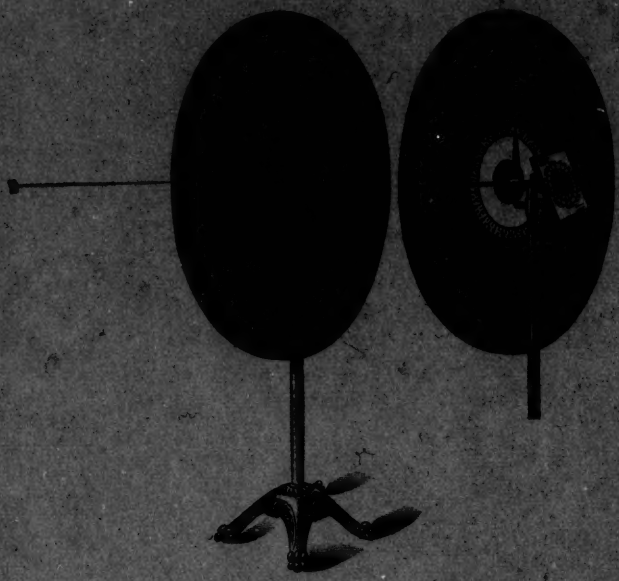

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COMMUNICATIONS

HYSTERICAL DISORDERS OF VISION

With special reference to the phenomenon of the contraction of the antagonists*

BY

LEWIS R. YEALLAND, M.D.

RESIDENT MEDICAL OFFICER, NATIONAL HOSPITAL FOR THE PARALYSED AND EPILEPTIC, QUEEN SQUARE, LONDON.

IN the consideration of any form of hysteria the mental state of the patients ought not to be lost sight of, and just as the physical disabilities vary in their distribution to the production of monoplegia, paraplegia, hemiplegia, tremors, fits, deaf-mutism, amblyopia, etc., so there is in most cases a psychopathic defect which may also vary in the patients so affected.

It is difficult to classify hysteria on a psychiatric clinical basis, although such grouping as amentia and dementia has been made in my cases. In the former, the moron, backward, and imbecile may be included; in the latter, such a diagnosis as dementia praecox has been suggested. What relation the degree of the mental defect bears to the type of the physical disability which is produced, is difficult to state, but it has been my experience to find such conditions as deaf-mutism and hysterical disorders of vision in the

* Read in the Section of Ophthalmology of the Royal Society of Medicine, June 12, 1918.

more highly mentally endowed of the ament. The recognition of the mental defect in these patients is important from the point of view of treatment, for such patients respond readily, as a rule, to various forms of suggestive measures, and the accessible channels for such suggestion are more or less dependent on the type of mental defect which is manifested. Although the physical defect which has been produced as the result of impressions of unpleasant experiences acting on a susceptible mind, leads to the production of hysterical disorders, it seems impossible to suppose that the mental equipment of such a patient can be altered or, at any rate, improved to more than its maximum capacity; favourable mental changes may, however, be looked for in the suggestive factor arising from the disappearance of the physical disability, and so there may be a return to a mental state which is normal to the patient.

My method of treatment, in brief, of such cases is, first of all, to make certain of the diagnosis, and then to assure the patient that he will recover with one treatment. Suggestions must be varied according to the mental state of the patient. He must always be made to believe that his condition is understood, and never led to suppose that it is of interest, apart from the fact that it is "one of those conditions which respond rapidly to treatment." It will be frequently found that the state of mind of the hysterical patient is such that the idea of having the particular disorder of function restored to usefulness does not tend to alter his negativistic attitude; and although the latter is observed, the one treating enforces a counter attitude, by impressing the idea upon him that the hopes of recovery are nothing but a source of happiness in the patient. This idea should be persisted in throughout the treatment. He should not be permitted to express his opinion on his condition, but be treated as soon as a diagnosis has been established.

Suggestions of a hopeful and a determined nature assisted by a steady disappearance of the disability soon create in the patient not only a willingness to recover completely, but an apparent pleasure at such a prospect. Moreover, the patient must be restored at one sitting.

It has been my experience to find visual disturbances the least common of all hysterical manifestations. This may be accounted for by the fact that the majority of the patients with whom I have had to deal have been those suffering from such conditions extending over a long period of time, and the majority of them had received some previous treatment. The duration of the disorder had continued in the military patients from two months to eight years; in the civilian patients, from two years to sixteen years. These have included blepharospasm, eight cases; spasm of accommodation, four cases; ptosis, one case; disturbance of the visual fields, two

cases; amblyopia, five cases. Some of these conditions had associated with them hysterical manifestations in other parts of the body, and in one of my cases of blepharospasm there was a peripheral neuritis with lost ankle jerks.

Hysterical disorders of vision may be grouped clinically into two classes, viz:

I. Conditions in which the contraction of antagonists may be demonstrated and II. conditions in which the contraction of antagonists cannot be demonstrated.

I. The phenomenon of the contraction of antagonistic groups of muscles acting before the principal movers begin, was first of all described by Beevor, in his Croonian lectures, when discussing the character of voluntary movement in hysterical hemiplegia. By contraction of antagonistic groups of muscles is meant contraction of groups of muscles which should be relaxed during the performance of given movements. I have attempted to demonstrate further this clinical characteristic, which, for example, is observed in hysterical stammering.* It will be my purpose when discussing the first group of cases to point out a similar phenomenon in hysterical disorders of vision which occurs in such conditions as blepharospasm, ptosis, and spasm of accommodation.

Blepharospasm

Blepharospasm is, to my mind, a typical example of the loss of function being due to the contraction of antagonists. In such cases the failure of vision is usually due to the inability the patient experiences when attempts at opening the eyes are made. It is, usually, though not always, bilateral. Often the condition is preceded by ptosis, or pseudo-ptosis and it is from the occurrence of the latter that one sees in blepharospasm a distinct resemblance to the rigidity following the flaccid type of monoplegia.

There are two sets of muscles involved in the mechanism of opening and closing the eye, viz., the levator palpebrae superioris and the orbicularis oculi. Each muscle is the antagonist of the other. Normally, when the eye is voluntarily opened, the levator palpebrae superioris contracts and the orbicularis oculi relaxes. In blepharospasm there is contraction of the orbicularis oculi, and when attempts at opening the eye are made the contraction of this muscle increases. That is to say, there is simultaneous contraction of the orbicularis oculi and of the levator palpebrae superioris. The action of the levator is overcome by its stronger antagonist. This contraction of the antagonists gives rise to spasm, spasm to lacrymation and sometimes conjunctivitis with the resulting pain. However, this spasm is not limited to the orbicularis oculi, for most of the facial muscles are involved in it. Upon the degree of spasm

* "Hysterical Disorders of Warfare," p. 74.

and the size of the palpebral apertures, whether they are partially or entirely obliterated in the spasm, depends the apparent loss of vision. A strong light thrown into the eye will, as a rule, increase the spasm. The spasm is not so marked in the dark, and when the patient sleeps it disappears completely, although when he awakens the spasm immediately reappears.

When I first treated these cases, the patient was seated 6 m. from a vision card and a small faradic battery was employed. The pad electrode was placed over the cervical spines and a key electrode used. The untreated eye was bandaged. The patient was instructed to close his eye and a mild current was applied to the closed lid for a few seconds, after which he was ordered to read 6/60. If he failed in his attempt, a stronger current was applied to the same part for about twice the length of time of the preceding application. At first he was allowed considerable time to decipher the first letter, but if he failed to read it the current was increased and the interval after each application shortened. When he succeeded in reading the first letter the current was again diminished and he was again allowed a longer time to read 6/36. The patient was constantly urged, with the assistance of faradism, until he was able to read finally the smaller letters of the card. When this was accomplished it was found that the spasm had disappeared. In treating the opposite eye, the one already treated was bandaged until complete recovery had been effected. No attention was paid to the spasm, and no reference of it made to the patient, the idea being to restore the sight. Before he was permitted to return to his ward it was necessary for him to read all the letters of another card, using both eyes. The patients treated by this method required considerable time before complete recovery took place.

It was found that when once the patient succeeded in reading the largest letter on the card, his mental attitude changed from a state of apathy to one of hope, and when this was accomplished it required only a short time to persuade him to read the smaller letters; but the length of time required to secure the first response varied from half an hour to one hour.

The method finally adopted consisted in bringing about the first return of function as rapidly as possible. This was done by placing the vision card a very short distance from the patient; indeed, in some cases the card was placed in the patient's hands. In one case of complete loss of vision due to blepharospasm the patient succeeded in deciphering the first letter immediately after the first faradic application. Re-education was also more rapid, and when the smaller letters had been successfully read by the patient, the blepharospasm had disappeared and he experienced no difficulty in reading 6/6—6/5. This method yielded appreciably more rapid results. To give an illustration of the latter method

I shall quote the case of a private, 26 years of age, who had been recommended for discharge from the Army in December, 1915, after an attack of "dysentery" and "myalgia." Instead of being discharged he was at some subsequent date transferred to a hospital in Manchester, where he was again considered as unfit for further military service. The patient, however, was sent back to France, he said, "through some mistake." In July, 1917, he first noticed a "twitching" in the left eye when doing transport work under shell fire when he was at Ypres. He complained of this whenever opportunity afforded itself, and each time he reported, he asked if he could be examined by an eye specialist. The "twitching" in the left eye was increasing daily, and flickering began in the right eye. November, 1917, he returned to England on 10 days' leave, and when leaving the train at a station in London he "completely lost his sight." A police officer saw him struggling to find his way through the crowded station and had him taken to the nearest military hospital, where he remained for three months, and while there began reading Braille. On admission to the National Hospital he was led by a comrade, and when walking through the hall he put his arms out in front of him. He said he could distinguish light from darkness. There was marked blepharospasm present. This patient recovered after ten minutes' treatment.

Ptosis

Only one case of ptosis has come under my observation and this was a genuine hysterical condition in which the ptosis was only part of the various hysterical manifestations. This patient was 30 years of age. Her father died of "paralysis" at 70 in an asylum, and one sister was found drowned. The patient suffered from fainting fits since the age of 18 years. She underwent twelve different operations for ear disease. A year before her admission to the National Hospital she had her appendix removed and ten months later the uterus and ovaries were removed.

On her admission to the National Hospital the right eye was completely closed, and she was unable to open it voluntarily, although when attempts at passively opening her lid were made there was marked resistance due to the violent contraction of the orbicularis oculi. When persisting with her for some time for the purpose of passively opening the lid there was marked blepharospasm. In addition to this symptom there was right facial paralysis and deviation of the tongue to the left, together with complete right hemianaesthesia. There were no signs of organic nervous disease. This patient was made to read the vision card and between her attempts at reading it faradism was applied to the closed lid by means of a key electrode. When she had succeeded in reading 6/5 the lid could be opened and closed voluntarily without difficulty.

It was interesting to observe that in this case blepharospasm preceded complete recovery.

Spasm of accommodation

The mechanism of accommodation depends upon the elasticity of the lens, which tends to approximate to the shape of a sphere. The lens is enclosed in a capsule, which is attached to the ciliary body by the fibres of the zonule of Zinn. These fibres are tightly stretched. In the act of accommodation, the relaxation of the zonule is effected by the contraction of the ciliary muscle.

The phenomenon of the action of the antagonists is difficult to demonstrate in functional spasm of accommodation, because there is only one muscle taking part in it. However, it may be explained on the assumption that the suspensory ligament of the lens performs an opposite action to that performed by the ciliary muscle. The tension of the suspensory ligament depends upon the relaxation of the ciliary muscle. The suspensory ligament which is held normally in a state of tension is only altered by the contraction of the ciliary muscle, when the latter contracts the ligament is relaxed; on the other hand, when the ligament is in a state of tension the ciliary muscle is relaxed. The spasmodic contraction of the ciliary muscle acting on the suspensory ligament, which is normally tense, produces a spasm which is similar to that produced when movement is made against voluntary resistance. If the best contraction of any muscle is dependent upon the relaxation of its antagonist, and if the suspensory ligament may be considered as the antagonist of the ciliary muscle, spasmodic contraction of the ciliary muscle acting on the suspensory ligament, which when at rest is stretched to its greatest extent, will produce spasm of accommodation.

Spasm of accommodation is usually, though not always, associated with either spasm of convergence or spasm of divergence.

In treating this condition, it is necessary to re-educate the patient to see near and distant objects. A faradic battery is employed; the pad electrode is placed over the cervical spines and a key electrode applied either to the closed lid or to hairless portions of the scalp or back of the neck.

My first case of this condition was that of a young Irish woman, twenty-one years of age, who had suffered from spasm of accommodation for periods extending over sixteen years. She had been under the care of competent ophthalmologists, and on one occasion she was taken to an eminent ophthalmic surgeon in Paris. Throughout the disorder the amount of the spasm varied, giving rise at times to very high apparent myopia. For a long period of time she was obliged to use atropin to overcome the spasm, the drops being placed in the eye every morning.

The treatment consisted in overcoming the spasmodic contraction of the ciliary muscles by re-educating the patient to fix first of all on distant objects, and after that to fix on near objects. She was made to read the letters on the vision card at six metres; the card was gradually brought closer and closer to the patient, but each time it was brought closer and read correctly it was again taken back to its former distance. The process of bringing the card nearer and afterwards withdrawing it was persisted with until the patient was able to read rapidly small print close to her, and immediately after look up and see clearly the smaller Snellen type at six metres distance. This case required about six hours' continuous treatment, the reason for this, no doubt, being that when the card was six metres distant from her, it was necessary for her to relax almost completely her accommodation. The re-education of the action of the ciliary muscle was in this case reversed, or, in other words, was a case of "cart before the horse."

The next case I treated was that of a woman of about 28 years of age, with almost complete blindness following an attack of measles simultaneously with a shock brought on by her knowledge of the court-martial of her fiancé. The condition existed less than a week, and a diagnosis of disseminated sclerosis had been suggested. When I saw her, there was marked spasm of accommodation with slight blepharospasm. This patient was treated by placing the vision card first of all close to her, while faradism was applied by means of a key electrode to the closed lid. After each application she was given an opportunity of reading all the letters she could on the card. When the response was not satisfactory the current was increased in strength and the application made longer. After she had succeeded in reading all the letters close to her, another card was placed, 1 metre away, then 2 metres away, until finally she succeeded in reading all the letters at 6 metres distance. When she had succeeded in reading a page of book matter she was instructed to read the lowest letters on the vision card at 6 metres distance. This she did without difficulty. This patient required about one hour's treatment.

My other cases have been treated on the same principles; one of them, with the disorder existing four years, was completely relieved after fifteen minutes' treatment.

II. The second group of cases are those in which the contraction of antagonists cannot be demonstrated. These include limitation of the fields of vision and amblyopia.

Limitation of the Fields of Vision

The cases of disturbances of the visual fields which have come under my observation have been patients in whom the contraction of the visual fields has been limited in all angles with slight

variations. Neither patient had received wounds. It is doubtful if these cases are really hysterical; they are decidedly not organic.

On examining these cases the following tests were applied. The patient was seated 1 metre from a Bjerrum screen, and the fields of vision mapped out for each eye, the pins being left in the screen while the opposite eye was being tested. Exactly the same constriction of fields was found in both eyes. The patient was next tested by means of an ordinary perimeter, and the fields on this occasion were found to be much larger. He was again taken to the Bjerrum screen, and instead of being placed a metre away from the screen was placed 1·5 metres away, the distance being increased unknown to the patient. Exactly the same field was discovered, the pins having been left in the screen. Such a limitation of fields could not possibly be genuine.

To explain to the patient that the examination yielded inconsistent results would be no doubt futile, because it is not likely he would have understood.

In treating such conditions it is desirable not to lead the patient to believe that malingering is suspected, but to assure him that the condition will readily respond to treatment.

The patient is seated at a perimeter, and a chart employed for the purpose of marking the improvement, and this shown to him. A pointer, to which a disc of 0·5 cm. in diameter is attached, is then moved out from the fixation point, starting at the horizontal meridian on the temporal field. Gentle faradism is then applied to the same angle on the orbital ridge, the angle being taken from the pupil as it is fixed on the fixation point on the perimeter. If there is no improvement with gentle faradism the current is increased until the field in that angle is increased. All angles 15 degrees distant are similarly treated, the part stimulated on the orbital ridge corresponding as nearly as possible with a similar angle from the pupil as it is fixed on the fixation point of the perimeter. Treatment of one angle is not discontinued until that part of the field becomes normal.

It is usually found that after the temporal field in one angle has recovered there is no need for further treatment. Both eyes are similarly treated. The patient is then shown the normal markings of the fields of vision on the chart, and he is also shown the extension of the markings of his own visual fields which approximate to the normal fields of vision. He is then told that his vision is normal.

The patient is again taken to the perimeter, the pins having been left in position. He is placed one metre from the screen, and when the fields are tested again it will be found that the screen is too small to mark his visual fields.

Various forms of disturbance of the visual fields due to hysteria

have been described; these have included homonymous and bilateral hemianopia, etc. Some cases of spiral fields, and of constricted fields, have been recorded by Kinnier Wilson,* who attributes their cause not to hysteria but to some molecular concussion. All of his cases had received definite head injuries.

Amblyopia

It has been my experience to find disturbance of the acuity of vision as a monosymptomatic manifestation of hysteria exceptionally rare. I have not yet seen a patient in whom the only complaint was that of binocular blindness. Such cases, however, have been reported, but in the reports that I have seen, it had not been stated whether or not blepharospasm was present. All my cases have been those of monocular blindness, and I am not in a position to state definitely whether all these were due to hysteria. I incline to the view that blindness not associated with blepharospasm or hysterical manifestations in some other parts of the body, is simulated. One of my cases of monocular blindness had a hysterical fit shortly after admission. I employed supraorbital pressure, which soon relieved the seizure. Immediately afterwards I placed a vision card in front of him and informed him that I intended to apply pressure over the nerves above his eyes until he was able to read every letter on the card. It was not necessary to apply any more pressure, as he was able to read the card correctly without the assistance of any additional physical distress.

The method I employ for the treatment of such cases is similar to that already described under the treatment of blepharospasm. It is best not to lead the patient to believe that malingering is suspected, but rather to impress on him the idea of the cure being permanent. He is told plainly that it is impossible to distinguish in his case between hysteria and malingering, and that the only proof of the genuineness of the condition is to be found in the permanency of the cure.

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* "Concussion Injuries of the Visual Apparatus in Warfare of Central Origin." *Lancet*, July 17, 1917.

ON THE TREATMENT OF PROLAPSE OF THE IRIS

BY

A. MAITLAND RAMSAY, M.D., F.R.F.P.S.G.

LECTURER ON THE EYE, UNIVERSITY OF GLASGOW; OPHTHALMIC SURGEON, GLASGOW ROYAL INFIRMARY.

PROLAPSE of the iris, whether due to a penetrating wound or to a perforating ulcer of the cornea, is always serious. In the majority of cases the aqueous quickly reaccumulates, and the anterior chamber re-forms; but the iris itself remains exposed, and that constitutes the real source of danger, because the prolapse interferes with the healing of the wound and lays the whole uveal tract open to infection, which may not only destroy the eye that has been injured, but may also lead to sympathetic inflammation of its fellow. The proper treatment of prolapse of the iris is, therefore, one of the most important problems in ophthalmic surgery. The method to be adopted in any particular case, and the success or failure of the treatment depend in large measure on the interval of time that has elapsed since the occurrence of the accident. If the prolapse be quite recent there is little difficulty in knowing what to do, but if several days have been allowed to pass before the patient is brought to the doctor, the prolapsed iris will be sealed to the edge of the rupture of the cornea by inflammatory exudation. The longer the time these adhesions have had to form the greater the difficulty for the surgeon, who must now be guided by experience whether it is wiser to interfere or to leave the case to nature. The expectant line of treatment is often the most prudent course to follow, for in many instances the result is quite satisfactory; but the patient will require constant supervision, and the surgeon will not be free from anxiety until the wound is securely healed.

The first step in the consideration of the treatment is therefore to distinguish between the cases that are of quite recent origin and those that are of more than forty-eight hours' standing; and although it may lead to repetition the methods of treatment will be described more clearly if a further distinction be made between those cases which are due to a penetrating wound, and those that are the result of a perforating ulcer of the cornea.

I. Prolapse of the iris due to a penetrating wound of the cornea.

(*a*) *A quite recent prolapse.*

A recent prolapse may readily be overlooked by the inexperienced, for the exposed iris, owing to its grey colour, is difficult to see. In every case, however, in which the iris is prolapsed the shape of the pupil is altered. It becomes displaced and pear-shaped, and the

narrow part always points to the prolapsed iris. The first indication for treatment is to try to draw the iris out of the wound back into the anterior chamber, and for that purpose atropin is used if the wound be towards the centre of the cornea, eserin if it be situated in the periphery. Although the use of these drugs is always recommended, it is only on rare occasions that they are successful, and there is the constant risk that, even although the visible prolapse disappears, an anterior synechia may follow, and give trouble in the future. The whole secret of successful treatment is to avoid the formation of an anterior synechia. Moreover, in the majority of cases the iris is bruised and has lost its elasticity, so that even if, by means of drugs aided by a spatula, it is put back into the anterior chamber, it has not sufficient contractile power to enable it to remain in its place, consequently it is almost certain to fall between the lips of the wound in the cornea, even if it does not prolapse again. There is, too, always the risk that, in replacing an iris that has prolapsed, infection may be carried inside the eye. All things considered, therefore, the best treatment for a recent prolapse is careful excision.

That operation, though simple in itself, ought never to be attempted by the inexperienced or by anyone who does not possess the proper instruments. Infection by pyogenic micro-organisms is the great primary danger, and failure will follow the most skilfully performed operation if there has not been strict attention to every precaution for the avoidance of sepsis. It is necessary, therefore, in order to avoid risk of infection from these sources, that the tear passages, the edges of the eyelids, and the conjunctival sac should be made as clean as possible before the eyeball is touched. The skin of the eyelids and the surrounding parts should be painted with 3 per cent. tincture of iodine immediately before the operation. A general anaesthetic is not necessary unless the patient be a child or an exceedingly nervous adult, but care must be taken to obtain perfect local anaesthesia by the free use of cocain and adrenalin solution. The lids are separated by a spring speculum—one that keeps the eyelashes out of the way is to be preferred. A good light is indispensable. The iris will now be seen exposed on the surface of the wound. It is to be caught firmly by forceps, and, while it is kept on the stretch, cut by a single snip of de Wecker's scissors, the blades being held parallel to the corneo-scleral margin and pressed backwards against the eyeball. If the iris be kept tense in that manner, the cut edges retract within the anterior chamber, and the coloboma resembles an ordinary iridectomy. It is very important that no tag remains adherent to the wound in the cornea. After the iris has been excised the lips of the wound must be brought into accurate apposition by means of a small spatula.

The risk of further infection is avoided by covering the wound with a flap of conjunctiva, which is an essential part of modern treatment. The flap is formed by dividing the conjunctiva at the corneo-scleral margin in the neighbourhood of the wound. The part of the conjunctiva which has been thus separated must be freely undermined, so that with the minimum of tension it can be drawn over to cover the wound perfectly. It is then fixed in position by one or two sutures. After the parts have been carefully dried, a coating of paraffin is applied to seal the edges of the flap to the cornea and give additional protection to the wound. The paraffin employed is a substitute for ambrine, and known as No. 7. It is non-irritating to the eye, and is readily applied in the liquid state by a medium-sized camel hair brush. It becomes solid almost immediately. After a drop of 1 per cent. atropin solution has been instilled, the speculum is removed and the lids are closed. The skin is painted again with iodine solution, and both eyes are carefully bandaged. The patient is put to bed, and, if no untoward symptoms occur, the dressings are not removed from the eyes for forty-eight hours. Pain and restlessness seriously interfere with healing, and ought at once to be overcome by a sedative draught, or by a subcutaneous injection of morphia. The patient as a rule, however, makes little complaint after being put to bed, and unless infection has taken place at the time of the accident, the eye is quiet and the pupil is dilated when the dressings are removed. Any discharge should be wiped away from the edge of the lids, a drop of atropin instilled, and the bandage re-applied to both eyes. In a week or ten days the sutures holding the flap give way, and the conjunctiva falls gradually back into place, leaving the wound of the cornea securely healed. The eye may now be regarded as free from danger. If sepsis occurs, means must be taken to overcome it; but, unless the affection be acute, the chance of a successful termination to the case is greatly increased by the protection afforded by the flap of the conjunctiva.

When the wound implicates the sclera as well as the cornea, it gapes, and is accompanied by loss of vitreous, and the prolapse includes not only the iris, but also the ciliary body and the choroid. The immediate danger in these circumstances is further loss of vitreous humour, consequently the spring speculum is to be avoided: there will be less risk of accident if the upper lid be held by an assistant with a strabismus hook or a light retractor. The bulbar conjunctiva should be separated from the posterior lip of the wound, and undermined freely for a considerable distance around the seat of injury. The whole of the prolapsed uvea must now be carefully excised, and the lips of the wound approximated by drawing the conjunctiva over the cornea like an apron, and fixing it securely in its new position by as many sutures as are required—

the fewer, however, the better. No attempt ought to be made to stitch the sclera.

(b) A prolapse that has existed for several days.—Here the prolapsed iris will have become sealed to the lips of the wound of the cornea by inflammatory exudation, and before any attempt at excision can be made, those adhesions must be carefully broken down. The longer the interval that has elapsed since the injury occurred, the firmer the adhesions, and the greater the difficulty in separating them from the prolapsed iris. If active infection has taken place, no attempt to reduce the prolapse must be made until the inflammation has subsided, and in all cases the greatest care in manipulation is necessary, because, after the iris is glued by exudate to the lips of the wound, rough or unskilful interference may readily open a path for the entrance of fresh sepsis to the interior of the eyeball. When the prolapse is small it is wisest to leave it alone: it will heal in a few weeks, forming a dense white scar which seals the wound, and binds iris and cornea firmly together. The cicatrix thus formed is, however, not free from danger, because, apart altogether from its being a probable cause of secondary glaucoma, it is, long after the injury, liable to infection, which may set up a suppurative irido-cyclitis that may terminate in panophthalmitis.

Whenever, therefore, it is possible to deal surgically with a prolapse, it is prudent to do so; but the *technique* of the operation must be carried out with great care and consideration. The iris must be separated thoroughly from the lips of the wound by breaking down the newly-formed exudate with a small spatula or a sharp probe, and when the case is of long standing it may be necessary to enlarge the wound, on either side of the prolapse, with a keratome. After the iris lies free in the wound, it should be grasped by forceps, pulled gently on the stretch, and excised with de Wecker's scissors, the blades being pressed firmly against the globe. As soon as the prolapse has been cut off, a small spatula should be passed into the anterior chamber, to make sure that no part of the edge of the coloboma remains in the wound. If any tags of iris tissue be discovered, they must be removed by fine forceps and scissors. If the edges of the wound show signs of septic infection they should be touched with the galvano-cautery, and afterwards covered by a flap of conjunctiva. In those cases it is my practice to give 4,000 units of anti-diphtheritic serum subcutaneously, and in twelve hours to repeat half that dose. In medicine it is easy to argue *post hoc ergo propter hoc*, but having seen at the bedside the favourable results that follow the administration of serum, I advise its use confidently in all cases where the eyeball is infected. As a rule, it gives rise to no constitutional disturbance.

II. Prolapse of the Iris due to a Perforating Ulcer of the Cornea.

Prolapse of the iris may follow the perforation of any ulcer of the cornea where the iris can come into contact with the edge of the opening, but it occurs most frequently in the round marginal ulcer seen in phlyctenular keratitis. The great majority of the patients are children, and the eyes are damaged irreparably when perforation of the ulcer occurs. What follows here is for the most part a description of the treatment of those cases. The time of occurrence and the size of the prolapse are the chief considerations; but as a rule the ophthalmic surgeon does not see the child for several days after perforation has occurred, and by that time secondary infection of the prolapse has in all probability taken place. Very rarely, therefore, does it happen that an opportunity for simple excision of the iris presents itself. In all those cases there is a very rapid proliferation of new-formed tissue which quickly seals the iris to the cornea, and if the prolapse be no more than a brownish black projection about the size of the head of a pin, it is soon covered by a layer of exudate, which, becoming vascularised, is speedily transformed into connective tissue. In these circumstances, the only prudent treatment is to leave the case to nature. After a few weeks, by the gradual contraction of the new cicatricial tissue, the prolapse gradually flattens to form a scar level with the cornea. The scar is usually somewhat pigmented by the remains of the prolapse, and is directly continuous with the iris in the anterior chamber. The treatment here consists in keeping the eye clean, protecting it from light, instilling atropin, confining the patient to bed, and attending carefully to diet and to everything pertaining to the general well-being.

When, however, the prolapse is large, the remains of the cornea and the newly-formed tissue are not strong enough to withstand the force of the intra-ocular pressure, so, instead of the prolapse flattening, it bulges forwards, and unless something can be done to arrest it the eye will be destroyed by anterior staphyloma or by general distension of the globe. In these cases an expectant plan of treatment is unsuccessful, and an attempt must be made to reduce the prolapse and to strengthen the cicatrix. Whenever the prolapse with its covering of exudate shows signs of bulging, operation should be advised. Where the patients are children, as in most cases they are, a general anaesthetic should be administered; and as the conjunctival sac is always infected it is my practice, in all cases, to fill it with perchloride of mercury ointment, 1 in 3,000 (White's ointment), the night before the day of operation. After the skin of the eyelids and the surrounding parts has been painted with iodine, and the conjunctival sac washed with warm sterile saline

solution, the eyelids are separated by a spring speculum. The conjunctiva is then seized by forceps and divided with scissors at the corneo-scleral border in the neighbourhood of the prolapse, and separated freely from the episcleral tissues. The prolapse is now burned down to the level of the cornea by a galvano-cautery, heated to a dull red, great care being taken not to destroy the exudate which seals the iris to the substance of the cornea, and if possible the anterior chamber should not be emptied. The conjunctiva which has been separated from the eyeball is then drawn over the prolapse and the ulcer of the cornea, so as to cover them completely. While the flap is held in position by two pairs of forceps, a small piece of conjunctiva should be excised on either side, in order that, when the sutures are tied, two raw surfaces of conjunctiva are approximated. That prevents the flap from slipping back into its former position, and greatly assists in securing the whole object of the operation, which is to bring about the firm healing together of the flap of conjunctiva, the cauterized surface of the iris, and the edge of the ulcer of the cornea. The conjunctiva covering the cornea should be supported by a layer of paraffin, and after atropin has been instilled and a disc of ten per cent. collargol gelatine has been introduced, the speculum is removed, and the eye carefully bandaged. The collargol gelatine melts slowly and seals over any raw edge of the conjunctiva with an antiseptic plaster. It is an undoubted advantage when both eyes can be closed, but those children's eyes bear bandages badly, and, of course, anything that may favour recurrence of conjunctivitis is to be avoided. The patient must be kept in bed, and watched carefully, lest from restlessness or other causes the bandages are disturbed. If all goes well, the eye ought not to be examined for forty-eight hours, when, unless there be a recrudescence of sepsis, nothing more requires to be done than to wipe the edge of the eyelids and instil atropin. In from three to four weeks the eye should be healed; but even then danger is not past, because the adherent iris blocks the angle of the anterior chamber, and secondary glaucoma with all its disastrous consequences may supervene. Iridectomy should, therefore, be performed whenever the eye is firmly healed. When the iris is drawn towards the cicatrix so that the pupil is obstructed, the iridectomy should be placed so as to give the most satisfactory optical results. Even at the best, however, vision is seriously impaired, and in cases of deep ulceration of the cornea every effort ought to be made to prevent accidental perforation by timely paracentesis of the cornea through the floor of the ulcer. By that means prolapse of the iris will be prevented, and the formation of anterior staphyloma avoided.

A CASE OF GLAUCOMA TREATED BY SCLERO-CORNEAL TREPHINING

Followed by hypotony; development of glaucoma later; secondary trephining; recovery; remarks on case and operative treatment of glaucoma generally

BY

A. E. J. LISTER, M.B., B.S.Lond., F.R.C.S.Eng., Major I.M.S.,

OPHTHALMIC SURGEON KING GEORGE'S MEDICAL COLLEGE HOSPITAL, LUCKNOW, INDIA.

CHOTI KHAN, Mohammedan, aged 50 years, embroiderer, first attended the out-patient department King George's Medical College Hospital on February 6, 1916. On examination the left eye was found to have no vision as the result of glaucoma. Patient complained that the vision of the right eye had gradually diminished and that he was not able to do his work. I regret that the amount of the vision was not noted on the ticket, but, as explained later, it was probably 6/24 and 6/36. "Cupping of disc" and the diagnosis of glaucoma were noted. The tension was not measured by the tonometer, but it was definitely raised. The case, in short, was a typical case of chronic glaucoma, of which I see large numbers. He was advised to have an operation. He consented, but could not come into hospital at once as he had to wait for the arrival of a relative to look after him. Patients in the East often defer the most pressing operations on this account, as they cannot take food from the hospital on account of caste restrictions. He was, therefore, given eserin drops to use as a temporary measure. He was admitted to hospital on March 11, and next day sclero-corneal trephining was performed according to Elliot's later method. The operation was uneventful and the patient made an uninterrupted recovery and was discharged on March 17.

The vision was not noted on his discharge, but he was satisfied with the result of the operation, so it could not have been much altered, as patients always complain if there is any loss of acuteness of vision, as I find is often the case after iridectomy. The next day the patient came back complaining he could not see at night. The tension was very low, minus 2. Nothing else abnormal noted in the eye. March 25.—The tension was very low. March 27.—Complained of great diminution of vision by day, which he had not previously complained of. Vision only "Fingers counted at 4·5 metres."

March 28.—A 1 per cent. solution of atropin sulphate instilled, in the hope that it might raise the tension. Next attendance March 31. —Vision much improved, now 6/60.

Atropin repeated on April 4, 5, and 6. On April 7 tension was normal to the fingers and vision further improved.

On April 10 he came back, and tension was found to be raised. He complained of no pain; tension, measured by the Schiötz tonometer, was 55 mm. Hg. Vision not noted. Eserin instilled. April 11.—Note: "Says he sees better than yesterday. Vision 6/36. Readmitted to hospital. He could not come in before. 0.5 per cent. eserin drops ordered to be used every six hours. April 12.—Tension 43 mm. Hg. Vision 6/36. April 13.—Tension 43 mm. Hg. Vision 6/36, but says it is more misty. Complains of slight pain. No signs of iritis." The tension did not diminish, and patient finally agreed to a second operation. A second sclero-corneal trephining was performed exactly as before, below and to the outer side of the other, on April 17. The patient made an uneventful recovery. I was not able to take the tension before he was discharged, as I went away on leave a few days after the operation. Vision was also not noted. I asked him to come to see me on my return, but he did not return till June 6. On that date his vision was 6/36. As he could not read, near vision was not noted. Tension 20 mm. Hg. June 7. Came for further examination as I was very busy on the previous day and could not finish my examination.

Note.—"No pitting of the conjunctiva on pressure with a lacrymal probe over the first trephine hole;" pitting obtained over the second trephine hole. "The iridectomy in both operations has resulted in a good clear coloboma." Patient did not attend again for a year. He next came on June 6, 1917. Vision was 6/36, tension 22 mm. Hg. Pitting of the conjunctiva was now present over both the trephine holes. As I found I had not noted his vision when he first came I asked him about it. He said it was now only very slightly worse than when he first came to see me. It must then have been about 6/24 to 6/36. He said it improved for about two months after operation, but since then has become a trifle worse. On examination, the lens was found to be a little hazy. This would account for the diminution in vision.

Remarks

It will be noticed that the notes of this case are not full, as compared with the notes of many cases taken in European clinics. On account of the war I have to carry on a large eye clinic, with the assistance of only one house surgeon, teach students ophthalmology, and in addition act as Professor of Physiology. One's notes, therefore, are necessarily of the scantiest.

I think, however, that any surgeon of experience will see that the essential facts of this very interesting case are quite clear. A case of typical chronic glaucoma was trephined by Elliot's method. As I am much indebted to Colonel Elliot for having shown me the

essential features of his operation on a pig's eye at an Oxford Ophthalmological Congress, I can vouch for it being done in the manner laid down. I should mention that atropin is instilled as a routine measure into every eye after Elliot's operation in my practice.

This patient, after a seemingly successful operation, developed "hypotony," and his vision was reduced to counting fingers at 4·5 meters, a most alarming state of affairs for a patient whose previous vision was about 6/36. After the use of atropin—I do not say it was due to the use of it, though it would appear to have some influence, as the tension rose after its use—his tension was raised to normal, and his vision increased to 6/60. Immediately afterwards, glaucoma supervened. This was completely relieved by a sclero-corneal trephining, done in precisely the same way as the previous operation. The apparent permanency of the relief is placed beyond doubt by the condition of the eye a year later. I am not clear as to the pathogeny of the case, and should like to hear the views of others on it. From the fact that there was no pitting on June 3, 1916, one might argue that blocking of the trephine hole had occurred, and I think it probably had. There were, however, no apparent local signs of inflammation, and no iritis was present. Had the wound been situated far back in the sclera, one might have thought that the dilatation of the pupil after the use of atropin might have approximated the root of the iris to the trephine hole, where it might have become adherent, and so caused blocking. This, however, is not possible, as I always split the cornea, and do an iridectomy in every case, taking great care to see there is no impaction of the iris in the trephine hole. Since I have adopted Elliot's plan of grasping the scleral disc and the iris together, I rarely have any trouble with the iris. Further, atropin is used after every operation as a routine measure.

The result of such a case will, I think, serve to cheer the heart of an operator who encounters such a formidable complication in future, and may encourage him to repeat an operation which has apparently led to such bad results. Critics will no doubt say that if sclero-corneal trephining produces such results they would prefer some other operation, but the fact remains that a similar operation was successful. It appears to me that a careful study of the literature of the subject shows that each of the different methods of treating chronic glaucoma has its disadvantages and advantages. None is yet perfect, as is the case also with so many surgical proceedings in my experience. With regard to the treatment of glaucoma, my experience, which is now an extensive one, as glaucoma is very common in India, is as follows: I prefer iridectomy for acute glaucoma without question. For a subacute case I prefer to do an iridectomy, and record the tension carefully, and to watch the

patient. If the tension rises later, I do an Elliot's operation. I seldom find this is required, but many of my cases come from long distances, and one cannot be sure of the after-results. In the iridectomy I perform, the iris is seized by the forceps on the outer side first, and a cut made in a radial direction with the iris scissors. The iris is then torn away from its deeper attachments for the whole length of the wound by means of the forceps. A second radial cut is then made at the inner side and the portion of iris between the two radial cuts removed. It is really an iridodialysis, and is, I think, superior to an ordinary iridectomy in glaucoma. For simple glaucoma I am delighted with Elliot's operation as regards its immediate results, but the constantly recurring reports of late infections, make me anxious about the future of such cases, especially in the part of India in which I work, where all kinds of conjunctivitis are so common. I have not yet, however, seen a case of late infection in my own cases, but I cannot be sure it has not occurred. I have not yet made up my mind as to the best way of treating these cases, and I think the particular circumstances of each must be taken into consideration. In cases which I have been sure of being able to trust to come for observation, I have lately been doing an iridectomy first. If this relieves the condition, the patient has the great advantage of not having a danger spot in the eye. If it does not relieve the condition, I do Elliot's operation. Iridectomy, however, I find in many cases, owing to the coloboma of the iris, and the astigmatism which may result, makes the patient, who does not realize the danger of his condition, dissatisfied with what, to the surgeon, is a successful operation. This is particularly the case with uneducated patients in India, who only realize that their sight is bad and who come to the surgeon to have it made better. Even if it is not improved, in spite of the most careful previous explanation, they are, in my experience, almost always disappointed; if it is made even a trifle worse they are almost always disappointed in spite of their being told that their sight will not now be lost. Elliot's operation, if it does not improve the vision, as it sometimes does, in my experience seldom diminishes it much. This is a very important point in a patient whose vision is already poor, and especially if he has only one eye, as is so often the case in India, where patients, having lost one eye from glaucoma from treatment by unskilled practitioners, come to an eye hospital for treatment of the other eye. Patients in my experience are very satisfied with the results of Elliot's operation, unless very ignorant. I have seen patients who suffered a great deal of discomfort from large ectatic scars. These I have never had in my own practice, but I have seen them in patients operated on elsewhere, often, I think, as the result of poor *technique*. Late infection, in short, seems to me to be the only serious drawback to

Elliot's operation. This, however, appears to be a danger common to all sclerostomies, and of all such operations Elliot's operation, in my opinion, is by far the best.

I may mention that all the notes, tonometric and other, in this case were made by me personally, but I am much indebted to my house surgeon, Dr. Brahma Gupta, for his care of the cases and for looking up the records for me.

THE TREATMENT OF INTRA-OCULAR FOREIGN BODIES AT A BASE HOSPITAL IN FRANCE

BY

H. P. GIBB, F.R.C.S.
(TEMP. CAPT. R.A.M.C.)

F. A. JULER, F.R.C.S.
(TEMP. CAPT. R.A.M.C.)

AND

R. FOSTER MOORE, F.R.C.S.
(TEMP. CAPT. R.A.M.C.)

IN April, 1917, a ring magnet was installed at a Base Hospital in France, at the instigation of Colonel Lister, A.M.S., and we have felt that the outcome of our experience with it may be of some interest.

We have no detailed statistics with regard to our cases, for when they are most frequent we have little time for making full records, and are unable to keep the patients under observation for any long period. In fact, in times of pressure we are frequently compelled to transfer them to England within a few days of the extraction of a foreign body.

We have kept two principles before us throughout.

First, we have put up to the magnet every case in which there was the slightest possibility of the presence of an intra-ocular foreign body, and as a consequence the number of our negative cases has been considerably greater than if we had been less punctilious. This procedure has been fully justified, for not only have we sometimes been rewarded in recent injuries, but also on six or eight occasions we have removed fragments from eyes which had been wounded a year or more previously. These were, we think, always cases which had suffered from other wounds and had not passed through an ophthalmic centre.

The other principle which we have observed, has been to patch up every eye that seemed to hold out the slightest prospect of being of value. Our feeling has been that we were usually unable to keep these patients here long enough to decide whether the eye should be sacrificed, and under these circumstances it was clearly unjustifiable to remove an eye which might ultimately be of some use, seeing that its progress could be watched by competent

surgeons at home. We have no doubt that many eyes on which we have spent time and labour here, have afterwards called for removal. The result of adhering to this principle has been that we have sent home a larger number of bad-looking, patched up eyes than if we had been able to keep the men here for a longer period, for in this latter case, more of the patients would have arrived home with a socket instead of a wounded globe.

X-rays.—We do not, as a routine, have a skiagram taken when a foreign body is suspected, for, as already stated, all such cases are put up to the magnet without delay. Localization is unnecessary, because the magnet in any case is first applied to the front of the cornea, with the exceptions afterwards mentioned. If the body is magnetic, it comes forward, if it is not, it stays behind; and the question of excision of the eye does not depend on the presence of the foreign body (though, of course, this is a factor in coming to a decision), but on the reaction of the eye to the injury, and upon the course of the case. X-rays will certainly have a bearing on the prognosis, but even here the presence of a foreign body does not condemn the eye completely; we have seen cases in which men have come out again to France with useful, and even good, vision many months after the original injury, in which a small metallic foreign body has been detected in the vitreous.

Technique.—The necessity for the use of atropin in every case need hardly be insisted upon.

Illumination.—For this purpose we have found the light from a 25-candle power carbon filament lamp, focussed on the eye by means of a lens held just within the ring, to be the most satisfactory. Metal filament lamps are very quickly destroyed by being brought into close proximity with the magnet.

We are satisfied that in the large majority of cases the better route for removal is the anterior one; the question of the posterior route is discussed later.

Magnet.—The patient is placed on the table, the eye cocainized, and the speculum inserted. The ring is then brought down, so that the damaged eye is as near its centre as possible. If this precaution is not observed, and the eye is allowed to approach the side, a considerable lateral pull towards the ring is developed, which tends to displace the foreign body within the globe towards that side.

The smallest rod is now brought slowly up towards the centre of the cornea until it actually touches it. Any movement of the iris or manifestation of pain is watched for, and in some cases movement of the foreign body itself, or of blood or exudate in the vitreous chamber, may be seen.

If this prove negative the larger rods are used, until the largest of all, the bent horn, is applied.

If the result is still negative with the horn applied to the centre

of the cornea, we now apply it in turn to the four quadrants of the sclerotic, as far back as possible, and afterwards to the centre of the cornea again.

The idea is, that by this means the magnet may be approximated closer to a foreign body in the posterior parts of the globe, and so one, which from its minute size or low magnetic affinity has failed to be brought forward by the magnet applied to the front of the cornea, may be got forward by this means in two stages.

In negative cases we usually apply the magnet again a day or two later, as we have found several times that a foreign body has come forward at a second trial.

The elicitation of pain is an important indication, especially in those cases where no movement is observed. It is clear that if the magnet causes pain every time that it is applied, a magnetic foreign body is present. It is sometimes not easy to satisfy oneself, in dealing with nervous patients, whether pain is really caused. If, however, the rod is applied, sometimes with the current switched on, and sometimes with it off, the patient being unaware of what is being done, one can invariably satisfy oneself as to whether the pain complained of is genuine.

At first we used the large horn fixed in the holder supplied with the instrument, and brought the patient's eye up to it; this we found cumbersome and unsatisfactory. We now use it free in the hands, in the same way as the other rods are used; the strain on one's wrist is great, but it is quite easily controlled. The removal of the plate of attachment for the horn increases the accessibility of the interior of the ring.

In any case, but more especially when using the horn in this way, care must be taken to have the current switched on before introducing the rod within the ring. If the rod is first introduced close to the eye and the current is then switched on, the rod is suddenly jerked downwards, and may well do serious damage.

If by any of these means the foreign body presents behind the iris, it is easier to discard the horn and use one of the smaller terminals for the purpose of bringing it into the anterior chamber; it should be applied to the opposite side of the cornea, so that the foreign body is made to slide along the back of the iris till it reaches the pupillary margin and so enters the anterior chamber. By this means one can usually obviate entanglement in the iris.

The foreign body is next brought into a position on the front of the iris at 3 or 9 o'clock, and the giant magnet is removed.

The operation is now completed by means of a small hand magnet of Snell's pattern with a contact button. The use of a keratome inside the ring is not easy, whilst the small magnet is powerful enough for this part of the operation.

The lashes of the upper lid are first cut away and the surrounding

skin is swabbed over with tincture of iodine. A keratome incision is made above, care being taken to keep the point well forward on withdrawal in order to avoid escape of aqueous.

The small magnet is then applied outside the cornea over the foreign body, which is next guided towards the wound, through which it can usually be withdrawn without insertion of the terminal of the magnet.

In some cases a translucent fibrinous exudate will be found in the anterior chamber, which will often come away with iris forceps. This is an indication of a mild infection; such cases seldom do well.

Removal through the sclera.—There are two chief classes of case in which we have found this route desirable:

First, those in which a recent wound of entry of some size exists here. Secondly, in cases where for some reason or another it has not been found possible to draw a magnetic intra-ocular foreign body forward, although its presence has been demonstrated.

1. When this route has been determined upon, the magnet must be brought up to the site of the wound straight away, and not to the cornea. If the fragment proves to be magnetic, we dry the area of wound and treat it pretty freely with pure carbolic acid. The damaged edges of the conjunctiva are next cut away with scissors. A conjunctival flap is now planned so that it will easily cover the area of the wound, and so that the line of sutures is well away from the perforation.

Having exposed the scleral wound by this means, the small magnet is brought up to the wound, the terminal being introduced within it if necessary, and the foreign body so removed. The conjunctival flap is sewn over and atropin instilled. Pressure on the globe must of course be avoided, and a general anaesthetic is always advisable.

2. We have had a few cases where the presence of a magnetic foreign body has been ascertained by means of the elicitation of pain by applying the magnet, but in which we have been unable to bring it forward into the anterior chamber. This may be due to its being of minute size and rather far from the cornea; to its entanglement in the retina or choroid; to its being only feebly magnetic: to the wounded swollen lens obstructing its passage forward; or to its large size.

We have found that in such cases the position of the fragment may be quite accurately localized by finding the exact spot on the sclera at which the magnet causes most pain. This can generally be stated precisely by the patient, and makes X-rays for the purpose superfluous.

This method of localization will be found surprisingly accurate; it is certainly a more accurate method than is supplied by X-rays, for the spot is noted directly upon the globe, and indeed in two of

our cases the foreign body has been so small that the X-ray report was negative.

The patient is able to say within a millimetre or two at which spot the pain is sharpest.

This spot must be noted with respect to some fixed point of the iris; a conjunctival vessel is no use for the purpose, as this will be turned back with the conjunctival flap.

It is also unsafe to make use of the method of comparing its position with the figures on the face of a watch, as the fixation of a globe by means of the stitch to be described, often causes rotation of the eye round a fore to back axis.

We have recently used this method in six cases. In all of them the foreign body was quite minute, and, as stated in two, the X-ray report was negative.

In five of them the foreign body came out immediately on bringing the magnet to the lips of the wound; in the sixth case the curved terminal had to be inserted within the wound, and the foreign body was removed at the third insertion.

Having now localized the foreign body by this means, the patient is placed under general anaesthesia. The eye is fixed in the most suitable position by means of a separate silk stitch inserted just outside the limbus away from the projected incision, and passed through the surrounding skin of the lids and cheek, and so tied as to fix the eye in the desired position. By this means any possible pressure on the eye, such as may occur when fixation forceps are used, is avoided. A conjunctival flap is then turned back as indicated in Fig. 1, the sclera is incised immediately over

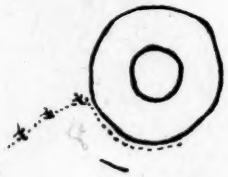


FIG. 1.

The dotted line shows the line of the incision for the conjunctival flap. The short line shows the scleral incision.

the point indicated by the patient as causing most pain with the magnet. A narrow v. Graefe's knife held vertically to the surface of the sclera is made to puncture the coats, and the puncture enlarged if desired *as the knife is withdrawn*, and never by see-saw movements. By this means and by means of the fixation stitch already mentioned, all pressure on the globe is avoided and no vitreous escapes.

We have usually made the incision in a line radiating from the

centre of the cornea limited as far as possible to the pars plana, but in three cases recently, the incision has been made concentric with the corneal margin, again limited to this area when possible, and we have been very pleased with the results. There was not the slightest loss of vitreous in any of the cases and the eyes did exceedingly well.

The incision having been made, a terminal of the Snell's magnet, which has been hammered out into a screw-driver shape, is brought into the lips of the wound, if necessary inserted between them, and the fragment so removed.

We have made no endeavour to suture the sclera or episcleral tissue for fear of expressing vitreous. The conjunctival flap is sewn over and atropin instilled.

Treatment of the wound of entry.—Treatment of the wound of entry with excision of prolapse of uvea should not be undertaken unless a magnet is at the same time available, for should a magnetic foreign body be present, a second operation and anaesthetic would be required; such cases, therefore, should be transferred as early as possible to a centre where complete treatment can be carried out.

Corneal wounds of any size, with a tendency to bulge, may, with advantage, be covered wholly or partly by a flap of conjunctiva. Previously to doing this the wound must be cleared of uveal tissue and of lens capsule, whilst, if necessary, a certain amount of lens matter may be evacuated.

In evacuating swollen lens matter it is well, in our experience, to do very little. The posterior capsule has nearly always been perforated by the foreign body, and if much lens matter is removed, a dark hole appears as the viterous comes forward, and any further attempt will lead to loss of vitreous.

The treatment of scleral wounds has already been dealt with.

Comparison of Haab and Ring Magnets.—As to the relative merits of a Haab and Ring Magnet, after an experience of both, our feeling is on the whole decidedly in favour of the Ring. We have had no experience with the suspended Haab. The following appear to us to be the advantages of the Ring.—The patient's head is firm and fixed, and so the difficulty of approximating the eye of a reluctant patient to the Haab terminal is avoided, the magnet is approached to the eye instead of the eye to the magnet.

Exposure of the eye by means of a speculum is more easily obtained. The graduation and direction of the pull are more easily controlled. The patient being on the table is in the suitable position for anaesthesia and any further treatment that is necessary. In stretcher cases, for example, a patient with a fractured femur, or chest wound, the advantage of this position is obvious.

It can be used for the exact localization of foreign bodies in the posterior part of the globe in the way described previously.

On the other hand, the Ring Magnet we have is of less power than the Haab at a neighbouring ophthalmic centre, which is a distinct disadvantage. We have no certain knowledge whether this disadvantage is overcome in the latest type of Ring Magnet. We have several times found after removing an eye which clearly called for it, and which had proved negative to the magnet, that it has contained a foreign body, which on testing afterwards was magnetic to a varying degree. Such foreign bodies were usually either feebly magnetic or were engaged in blood clot or exudate or were far back in the globe.

We have no means of judging whether some of the cases which we have sent home marked negative to magnet may, perhaps, have proved positive to a Haab.

In two or three cases of feebly magnetic foreign bodies we have watched, either by the ophthalmoscope or by oblique illumination, a fragment move slowly towards the magnet when it was applied and fall away as slowly when the current was broken.

Occasionally a needle-shaped foreign body will come forward and impact itself in the cornea so that it remains in this position after the break of the current. In these cases a curious physical phenomenon occurs, which when first seen is rather striking. As the terminal of the magnet is moved across the cornea, the foreign body tilts in the opposite direction, the point remaining impacted in the back of the cornea. This is explained by the fact that the long axis of a magnetizable body tends to turn in the direction of the lines of force when brought into a magnetic field.

It is for this reason also that steel fragments, when removed by the magnet, fortunately come out lengthwise instead of broadside on.

On several occasions we have seen a small foreign body come forward from behind and remain as if adherent to the front of the lens for quite an appreciable time. It has then suddenly come forward to the cornea, as if it had been previously held against the capsule of the lens perhaps by some fine exudate. It was clear that the foreign body was not under the lens capsule, it came forward too easily and quickly, and in one case five days later the lens was perfectly transparent except for the presence of a Vossius ring. If this observation could be confirmed in other similar cases, it might add some weight to the theory that the ring is due to an exudation on the lens capsule.

We have seen one case only of siderosis. This was in a man who had been wounded five months previously. It was the siderosis which especially suggested the need for applying the magnet, and a fragment of iron was removed.

In two cases we have seen the presence of an intra-ocular foreign body associated with a fixed and semidilated pupil which was not

explained in any of the usual ways, a condition which has been pointed out by Tuckett *(British Journal of Ophthalmology*, February, 1918.)

SIDEROSIS BULBI

BY

F. H. VERHOEFF,

BOSTON, MASSACHUSETTS.

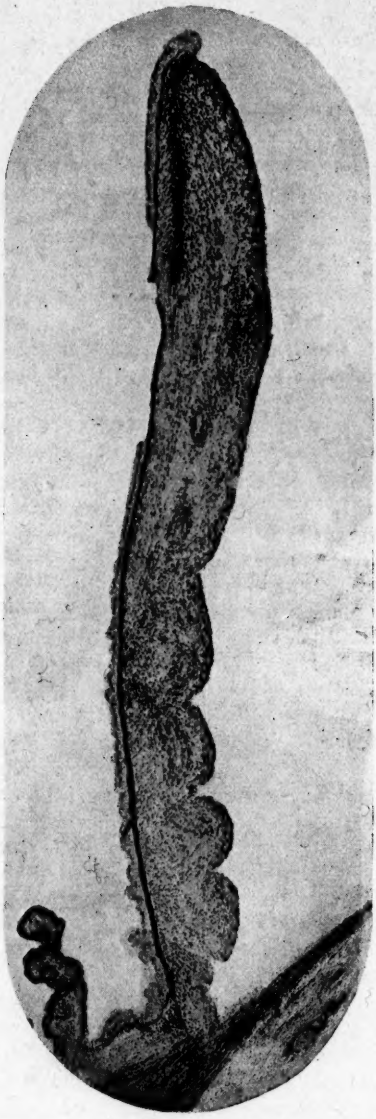
In the BRITISH JOURNAL OF OPHTHALMOLOGY for February there appeared a communication by Ivor Ll. Tuckett, M.D., on "Siderosis Bulbi," in which the author concludes that iron salts have a selective action on the nerve terminals in the dilatator and constrictor muscles of the iris. This conclusion is based on the fact that in the case reported the pupillary reactions became abolished, and were later restored after removal of the foreign body.

About thirteen years ago I made the observation that the cells of the dilatator, and, to a less extent, those of the constrictor muscle also, become densely packed with iron pigment in cases of siderosis bulbi, more so, in fact, than any other cells in the iris. This observation I have confirmed many times since, and in a discussion before the American Ophthalmological Society in 1906, I made brief mention of the fact that the dilatator muscle has a marked affinity for iron. The accompanying photograph strikingly illustrates this fact. It is of a section stained in haematoxylin and eosin, in which all of the natural pigment has been bleached by a modification of Alfieri's method.* Why such an evident condition has been overlooked by other observers is difficult to understand. From my observations, therefore, it would seem that the impaired motility of the iris in siderosis bulbi is not due to selective action on nerve terminals, but to impairment in function of the muscles of the iris resulting from their affinity for iron. In advanced cases of siderosis, chronic iritis is set up, which no doubt also impairs the motility of the iris.

The ciliary muscle, I find, becomes pigmented only in the immediate vicinity of the ligamentum pectinatum. This may be due to the fact that fluid containing iron does not reach it elsewhere, or to the fact that owing to its different origin it has less affinity for iron than the iris muscles.

The author of the communication referred to seems to be under a misapprehension in regard to the pigmentation of the lens that occurs in siderosis bulbi, he assuming that in his case the siderotic

*VERHOEFF and FISHER.—An improved method of bleaching pigmented tissues.—*Arch. of Ophthal.*, 1908, p. 561.



Intense pigmentation of the dilatator muscle of the iris in a case of siderosis bulbi. The natural pigment of the iris has been completely bleached so that the dilatator is plainly seen as a black line. The constrictor muscle is also pigmented, but this is not obvious in the photograph.

particles were deposited on the front of the lens capsule. It is, of course, well established that the deposits occur neither upon nor within the capsule proper, but immediately behind it in the capsular epithelium. Here they tend to form two circles, one corresponding in position to the pupillary margin and the other occurring further out, but it is seldom that either of the circles is well defined.

ANNOTATIONS

Optical Glass

Among the many key industries that in pre-war days we weakly allowed to pass into German hands must be included optical glass employed in the manufacture of field glasses, telescopes, and fire-control instruments. It will be recalled that in the earlier part of the war we were hard put to it to provide the necessary optical help to allow our officers to see properly at the front and that the deficiency was in part remedied by Lord Roberts's far-flung appeal for gifts of binoculars from those who happened to possess them.

Since then great strides have been taken in the making of optical glass, as anybody could convince himself by a visit to the recent British Scientific Products Exhibition, at King's College, London. Thanks largely to Sir Herbert Jackson, K.B.E., professor of chemistry at King's College, there has been an awakening of the glass industry, and we need never again go to Germany for optical glass. Meanwhile the *American Journal of Ophthalmology*, July, 1918, tells us how the situation has been met in the United States. In 1917, when that country entered upon the war, the optical glass situation was critical. Such glass was then made by four firms only, and the European supply was practically cut off. The geophysical laboratory of the Carnegie Institution of Washington was called upon, and a party of scientific men was detached from the laboratory and stationed at the plant of one of the manufacturing firms. At the end of several months essential details of the manufacture had been developed and glass in considerable quantities was being produced. The knowledge gained by the laboratory was then extended to other firms, with the result that at the present time large quantities of optical glass of the kinds needed for military fire-control instruments are being produced, and of a quality equal in every respect to the best European glass.

Hospital for Ophthalmia Neonatorum

On several occasions we have drawn attention to the necessity of making provision in large towns for the collective treatment of cases of ophthalmia neonatorum, thus following the example of Liverpool and Glasgow. It may be recalled that under the impetus afforded by the Report of the Departmental Committee on the Welfare of the Blind, issued in 1917, the Local Government Board requested the Metropolitan Asylums Board to provide hospital treatment for certain cases of the disease. The latter body arranged to establish two hospitals, one north and the other south of the Thames. One of the two institutions, formerly St. Margaret's Home, belonging to St. Pancras Union, was opened on September 15 last. It is called St. Margaret's Hospital, and is situated in Leighton Road, Kentish Town, and provides accommodation for about thirty infants and for rather more than half that number of nursing mothers. Cases are admitted on application to the central offices (Embankment, E.C. 4) in much the same way that infective diseases generally are received into the Asylums Board's other hospitals. The Board's ambulance service is available for purposes of transport. Mr. M. S. Mayou has been appointed visiting ophthalmic surgeon, and Dr. C. G. May, visiting gynaecologist to the new institution.

ABSTRACTS

I.—THE EVOLUTION OF LIGHT AND OF COLOUR SENSE

Hess, C. (Munich).—The evolution of light sense and colour sense in the animal kingdom.

Hess delivered a lecture on the evolution of light and colour sense in the animal kingdom at the Eighty-fifth Congress of the Society of German naturalists and medical men held in Vienna in 1913, a translation of which has kindly been furnished to us by Mr. D. V. Giri. The pressure on our space prevents us from publishing it in full. Hess insists on the importance of working with proper spectral colours the luminosity of which is sufficiently accurately known for the human eye under different conditions. He gives details of various experiments carried out with different animals. In dealing with vertebrates he tested monkeys by putting grains of rice on a black surface and illuminating them with the spectrum. The monkey picked up the grains of rice exactly as a human eye

saw them under various strengths of light and conditions of dark illumination. A hen, when tested in the same way, gave evidence of considerable shortening of the violet end of the spectrum. The same result was obtained with the tortoise. Hess explains this as due to absorption of the short waves by the so-called oil globules to be found in the cones of the sauropsids. The fishes conduct themselves altogether differently from the other vertebrates. Those fishes that are guided chiefly by sight in obtaining food seem to have a distinct shortening of the red end of the spectrum. Hess found that certain fishes always swam towards the brightest light, and that in many species surprisingly small variations of luminosity suffice to collect them in what appears to them the brightest part of their receptacles. By experimenting on these lines he finds that the green part of the spectrum is the brightest to them, and not, as in the human eye, the yellow. He comes to the conclusion that the colours of the spectrum have the same relative luminosity to the fishes as to the totally colour blind human eye. The strong absorption of the red light at even moderate depths renders this colour of little value to fishes. All fishes do not serve equally well for these experiments as certain of them are guided by the sense of smell, rather than that of sight, in obtaining their food. In the amphioxus, the lowest known vertebrate, light calls forth movements and these are more lively as the light is brighter. Here, again, it is the green part of the spectrum that elicits most movement, next the blue, while the red rays have almost no effect. Similar results are to be obtained in cephalopods, and in these animals the results can be checked by the pupil reaction which is found to correspond. Hess says he finds that the pupil of the totally colour blind human eye behaves in a similar way.

The same results were obtained with caterpillars and gnats. Bees, like the other animals experimented on, also make for the brightest illumination. If one half of their receptacle is illuminated with red, and the other half with blue, the former has to be made much brighter to our eyes before the bees will go to it. Hess has something to say about fluorescence, a property possessed to a surprisingly high degree by the crystal cones in the eye of the arthropod. He suggests that the prevailing luminosity at the depths at which some of these creatures live is very low, and that the short length waves of light which produce the fluorescence penetrate furthest.

He concludes as follows:

"In the aquatic animal or organisms the specific energies of the nervous substance of the visual organs invariably takes into account only the impression of the colourless luminosities; in the vertebrates, with the transition into aerial life and the consequent subjection to the influence of the much greater variety of the

radiations reaching the visual organ, these specific energies have undergone transformation in virtue of which they now bring into consciousness not only the colourless luminosities, but also the variegated colours. This, however, is not in the sense that altogether different energies displace the original ones, for the latter reappear in the remarkable abnormality we know as total colour blindness."

Numerous photographs illustrating his experiments accompany the paper.

II.—OPERATIONS

Cataract.

(1) **Elschnig (Prague).—Simple flap extraction of senile cataract with incision of the root of the iris. (Einfache Lappenextraction der senilen Katarakt mit Iriswurtzelinzision.)** *Arch. f. Augenheilk.*, Vol. LXIX, Part iv, 1911.

(1) **Elschnig** lays down the contra-indications to simple extraction. There is only one which is absolute: if the pupil fail to dilate with homatropin, the iris is rigid; simple extraction must not be chosen.

The chief objection to this method of operating is the comparative frequency of iris prolapse. In spite of careful selection of cases, this complication was recorded by the author in 4.7 per cent. of his simple extractions. Haessig, of Basle, noted 25 per cent.; Hesse, 8.8 per cent.; Marshall, 13·86 per cent.; and de Wecker, 3.4 per cent. The statistics for the combined method are much better; Haessig, 1.9 per cent.; Hesse, 3.3 per cent.; and Knapp, 8 per cent. Elschnig does not excise a prolapse. He prefers to incise it and then to replace it within the eye. He has never seen any ill effect follow reposition.

In order to avoid prolapse, Hesse performs a peripheral iridectomy which has reduced his prolapse figure to 0.66 per cent.

Elschnig, before Hesse published his method, had occasionally made an incision into the iris root, but after reading Hesse's paper, he made it a constant part of his simple extraction. The result has been to reduce the number of prolapses to zero.

The procedure is carried out in the following manner.—The section is made with a conjunctival flap, and the capsule removed with capsule forceps. The edge of the conjunctival flap is seized with forceps, and the iris root exposed. The iris is now pierced close to the scleral edge of the wound, a fold raised up, and the

scissors closed. The incision is about one millimetre long and is parallel to the edge of the cornea.

Elschnig prefers his incision to Hesse's basal iridectomy. It is easier, trauma is less, and there is no chance of the lens entering the coloboma rather than the pupil.

T. HARRISON BUTLER.

(2) **Constantinescu, Ilie (Bucharest). — Advancement of the conjunctiva in cataract extraction. (Ueber die Vorlagerung der Bindehaut bei Starextraktion.)** *Klin. Monatsbl. f. Augenheilk.*, March-April, 1914.

(2) **Constantinescu** believes that he has found in the covering of the incision with conjunctiva a protection against post-operative infection in cataract cases which he has not obtained by means of prophylactic serums, etc.

His method of incising the conjunctiva along the limbus, undermining it, and subsequently drawing it down over the wound by means of sutures, is not entirely new; but he lays particular emphasis on the necessity for dissecting up the conjunctiva only, without the submucous tissue, since the elastic fibres of the latter cause retraction of the flap from the wound.

A. J. BALLANTYNE.

(3) **Axenfeld (Freiburg i. Br.).—External canthotomy in cataract operation. (Blepharotomia externa während der Staroperation.)** *Klin. Monatsbl. f. Augenheilk.*, Vol. LIV, 1915, p. 97.

(3) Under novocain anaesthesia the external canthus, including the orbicularis muscle, is divided almost as far as the orbital margin. Bleeding is checked by swabbing with perhydrol and the extraction is proceeded with. This measure is recommended in cases where the palpebral fissure is very narrow, and in certain cases in elderly people in which the speculum causes the skin at the outer canthus to become elevated above the level of the cornea. No untoward complications need be anticipated, and the operation is facilitated in timid or refractory patients.

H. M. TRAQUAIR.

(4) **Elschnig (Prague).—Intra-ocular reposition of the iris. (Intraokulare Irisreposition.)** *Klin. Monatsbl. f. Augenheilk.*, February-March, 1915, p. 186.

(4) Occasionally, after extraction of soft cataract by a keratome incision, either in traumatic cases or following discission, the iris may become drawn up towards the wound. To remedy this, **Elschnig** introduces a fine needle into the anterior chamber from the side and, passing the point upwards, divides the tissue on the surface of the contracted part of the iris. If a tag of capsule is adherent to the cornea it may be divided. If the iris tissue itself

is involved the point of the needle may be inserted into its superficial layer and the iris levered downwards so as to replace its pupillary margin. Eserin is used for the first day, afterwards atropin. It is claimed that the operation is safe and its results lasting. The possibility of producing iridodialysis is the only danger, and this is not regarded as serious. Elschnig has been successful in five cases.

H. M. TRAQUAIR.

(5) **Verhoeff, F. H. (Boston).—Improved capsule forceps for intracapsular cataract extractions.** *Arch. of Ophthal.*, Vol. XLV, No. 5, September, 1916.

(6) **Knapp, Paul (Basle).—Disturbances in the formation of the anterior chamber after cataract extraction.** (Störungen in der Bildung der Vorderkammer nach Starextraction.) *Klin. Monatsbl. f. Augenheilk.*, January, 1917.

(6) **Knapp,** in this paper, gives notes of two cases of disturbance in the formation of the anterior chamber after cataract extraction.

The first case was that of a woman, aged 53 years. She was in an anaemic and depressed condition as a result of profuse menorrhagia. A preliminary iridectomy a month before the extraction was accompanied by a good deal of haemorrhage. The extraction (no details are given of the operation) was followed by no reaction and, after needling three weeks later, vision of 2/3 was obtained. Six weeks later she returned with a collapsed anterior chamber and a tension of minus 2. Vision was reduced to 1/4. A fine fistula could be seen in the middle of the scar. This was twice cauterized with a successful result. Three months later the fistula reappeared and the anterior chamber again collapsed. Cauterization and transplantation of a conjunctival flap met with no success, but three weeks later the anterior chamber suddenly re-formed with an acute glaucomatous rise of tension. This yielded to treatment with miotics. One year later the eye was in good condition and the other eye was successfully operated on. The author considers that the defective condition of the general health was responsible for the breaking down of the scar.

The second case was that of a woman, aged 67 years, on whom a preliminary iridectomy had been done six years previously. The extraction was made with a conjunctival bridge, and a large piece of the anterior capsule was removed with capsule forceps. No inflammatory symptoms followed, but the anterior chamber failed to re-form. The pressure was slightly raised. As the chamber had not re-formed after three weeks, and a glassy-looking spot could be seen in the middle of the scar, Knapp considered that there might be some capsule caught up, especially as the corneal astigmatism amounted to 10 D. He cauterized it energetically, but without result. Vision with correction was 0·4. Tension remained

high, but there was no pain or steaminess of the cornea. As eserin had no effect, Knapp performed a posterior sclerotomy and allowed some vitreous to escape. The same evening the tension was still higher and the cornea hazy. As there was no improvement a fortnight later, he trephined the eye and made a small iridectomy. Temporary improvement followed, but the condition relapsed and a fortnight later he again trephined the eye with a larger trephine and did a liberal iridectomy. As a result of this the same evening the eye was stone hard with a very deep anterior chamber. Two days later the conjunctiva over this second trephine hole gave way, and the eye was obviously infected, with exudation in the anterior chamber and acute iritis. The conjunctiva was separated from the hole which was deeply cauterized and then the flaps replaced as well as might be. The next procedure was a large iridectomy at the opposite side of the eye. This also proved useless, so a third trephine operation also with iridectomy was performed. It seems a little difficult to see how any iris could still be left. Success attended this final attempt, and four months later the vision was 0·8 and Jaeger 1, pressure normal.

E. E. H.

(7) **Mulock Houwer, von A. W. (Amsterdam).—The operation for zonular cataract.** (**Die Operation der Cataracta zonularis.**) *Klin. Monatsbl. f. Augenheilk.*, Feb.-March, 1917.

(7) **Mulock Houwer** describes the operation in general use in cases of lamellar cataract at the Amsterdam Clinic. The object aimed at is to get the nucleus of the lens into the anterior chamber. He explains that by nucleus he means the central clear portion, as a genuine anatomical nucleus does not exist at the early age at which such cases are usually submitted to operation.

The procedure is as follows: A straight or bent discission needle is inserted subconjunctivally through the temporal side of the limbus after the pupil has been fully dilated with atropin. The anterior capsule is freely opened and the anterior layers of the lens stirred up. The next step consists in manipulating the point of the needle so as to coax the lens centre forward into the anterior chamber. No hard and fast rule can be laid down as to the best way of doing this. If the anterior layers have been thoroughly broken up in the first stage of the operation there should be no special difficulty. This ends the operation. In some cases the lens fragments absorb without giving rise to any trouble. Since the lens fragments are all in front of the iris there is not the same tendency to cause a rise of tension as in the ordinary operation, in spite of the very free discission. In any case the author claims that should it be necessary to let out the lens matter there is less risk of prolapse of iris than when the swollen and partially

disintegrated lens lies behind the iris. Should it be considered necessary to let out the lens the incision is made at the limbus. As no mention is made of the possibility of an anterior synechia, we presume that the Amsterdam Clinic is lucky enough not to have met with this complication. The reviewer has always preferred to make the section at the junction of the middle and outer third of the cornea so that this complication when met with may be easily treated, which is not the case with a peripheral adhesion. The author points out that when evacuating the lens it is neither necessary nor advisable to try to remove all the swollen material.

He also, and as we think wisely, advises a discission of the posterior capsule, even when the vision is good, should the patient be likely to be unable to get skilled advice easily in the future.

The practice at Amsterdam is to operate on all cases whose vision is 1/4 or less, but some attention must be paid to the social position of the patient. The poorer classes may prefer to have less vision rather than go to the trouble and expense of glasses.

From 1910-1916, 26 operations for lamellar cataract were performed. These operations were performed on 15 patients, 11 of the operations being bilateral. The only case which got acute glaucoma was one in which the manipulation failed to bring the nucleus forward. In this case the iris prolapsed after the evacuation and a sclerectomy had to be performed before the tension remained low.

Lamellar cataract seems to be much less common in Amsterdam than in London.

E. E. H.

(8) **Green, A. S., and Green, L. D. (San Francisco).—The Smith-Indian cataract operation illustrated by moving pictures.** *Ophthalmology*, April, 1917.

(8) **A. S. and L. D. Green** have succeeded in taking moving pictures of the operation of intra-capsular cataract. In the present article a selection of negatives from the film has been reproduced after enlargement. The reproductions are excellent and give a better idea of the steps of the operation than pages of writing. The authors have studied at Jullundur under Smith and are convinced of the superiority of the operation. At the end of the paper they say that they have now performed the operation in about 150 cases of Americans for senile cataract, and propose at a later date to publish a detailed analysis of their results.

E. E. H.

(9) **Barraquer and Anduyned (Barcelona).—An extremely gentle method for the extraction of cataract "in toto." (Un procédé d'extrême douceur pour l'extraction "in toto" de la cataracte.)** *La Clin. Ophtal.*, June, 1917.

(9) One has so often thought that the ideal has at last been reached, and has so often found that a "new" method was either very old, or useless, or both old and useless, that sometimes one is tempted to treat with scant notice what seems too ideally good. The reviewer is unable to say whether the procedure here described is new, but it is so, as far as his knowledge goes. At any rate, the arguments of the authors seem so sound, and the method appeals so forcibly to one's surgical sense that every prominence should be given to publication of the article, albeit it is of the most modest dimensions.

The authors begin by stating, what is obviously true, that extraction of cataract in the capsule is the ideal operation provided the loss of vitreous can be avoided, and that such loss of vitreous is the stumbling block to its general adoption. This loss of vitreous is due to the application of a dangerous amount of force or to the employment of a zonulotome blindly between the iris and the lens. If the coats of the eye of a cadaver be carefully removed, leaving the vitreous and lens together, one can separate the lens from the fossa patellaris by drawing on it with forceps, breaking the zonule without breaking the hyaloid. One can then take up the vitreous and pass it from hand to hand without any fear of loss unless one presses it or pricks it. Such pressure or pricking is exactly what takes place in the operation of extraction of the lens in its capsule by the recognized method. The authors seek to imitate the experiment applied on the cadaver, of drawing the lens gently away from the vitreous, and the method they have evolved is the introduction of a sucker (*ventouse*) into the anterior chamber. This sucker, attached to a pneumatic apparatus, is made to apply itself to the lower portion of the lens in its capsule and the lens and capsule are gently withdrawn. The following are the exact words:

"The procedure is extremely simple. A flap having been cut, with or without iridectomy, one so places the sucker that it occupies the lower part of the pupil and passes behind the iris in order to get a grip on the lower part of the lens. But it is not necessary to go quite to the periphery: it is enough that the instrument be placed a little lower than the centre of the lens and behind the pupillary border. This stage having been reached the vacuum is made, and with the instrument the lens is rocked (*basculer*) so that its upper edge is advanced a very little (*un tout petit peu*). The traction necessary to make the zonule yield should be very slight, much more so than in the anatomical experiment to which we have referred, because the vitreous has the resistance of the ocular membranes behind it. The most striking thing is that one does not observe the least indication of violence and does not appreciate the least resistance. The operation is much facilitated by strong cocain mydriasis."

The authors call the operation "facodialysis," though "phacodialysis" would appear to be a more correct spelling. There is a plate showing the steps of the procedure, although this seems hardly necessary, and another showing some of the details of the pneumatic apparatus. This is not of the first importance because, if the principle of the operation be correct, the details of the exact apparatus used are bound to be modified by individual surgeons. One can foresee such modifications almost by the dozen. Have we arrived at the proper method of extraction within the capsule?

ERNEST THOMSON.

Iridotasis

(1) **Verhoeff, F. H. (Boston). — Histological findings after iridotasis.** *Arch. of Ophthal.*, Vol. XLV, No. 1, January, 1916.

(1) **Verhoeff** describes the histological findings in an eye in which iridotasis failed to relieve tension. The operation, which is comparatively little known in England, consists in "withdrawing the iris through a keratome incision, beneath a large conjunctival flap, and allowing it to remain there; the iris is grasped near the pupillary margin, so that when it is withdrawn the pigment is opposed to the anterior lip of the wound, and thus prevents the latter from uniting with the iris."

In the case under discussion, Verhoeff found the iris cyst in free communication with the anterior chamber; outside the iris tissue was a thick layer of newly-formed fibrous tissue, which gradually lost itself in that of the episclera, and which was in a state of active cell proliferation. This adventitious coat effectually shut off the fluid of the anterior chamber from the subconjunctival space. Verhoeff calls attention to the fact that the case was one of advanced, chronic, congestive glaucoma, "just the kind of case in which Borthen states the operation is likely to fail." Verhoeff gives his views as to the sequence of events in this case: "Traction of the sphincter pulled the pupillary margin downwards until it came in contact with the anterior lip of the wound and adhered to it. As a result, all drainage was cut off, and the prolapsed iris simply formed a distended cyst."

To the reviewer's mind, too little stress is here laid on what he regards as the principal factor, viz., the action of the encircling layer of newly-formed connective tissue, thrown out from the episclera. The same thing is seen after trephining, Lagrange's operation, or any similar procedure, and at least breathes the suggestion that asepsis has not been perfect. Be it remembered, however, that the very nature of the affection may have precluded a perfect asepsis

before the operation was even begun. In conclusion, one can only express regret that able and experienced ophthalmologists can still be found to approve of operative procedures which aim at the deliberate inclusion of iris tissue in the wound. The reviewer holds that these procedures are wrong in principle and dangerous in practice, and that they should be eliminated from our list of operations.

R. H. ELLIOT.

(2) **Stieren, Edward (Pittsburg, Pa.).—Iridotasis in glaucoma.** *Ophthal. Record*, February, 1917.

(2) **Stieren** thus describes Borthen's operation of iridotasis.—"The eye is cocainized thoroughly, and a conjunctival flap made as in the trephining operation. The flap need not be as large, nor is it necessary to carry the dissection to the corneal layers; but the flap should contain all the subconjunctival tissue down to the sclera. A small keratome incision is then made under the conjunctival flap just behind the limbus, and just large enough to admit the iris forceps. The pupillary edge of the iris is grasped and gently withdrawn, and when released outside the corneal incision it will be noticed that the under surface of the iris is now uppermost. The conjunctival flap is stroked back into place and the speculum carefully removed, the operation requiring not more than five or six minutes to perform."

Borthen recommends that a drop of 1 per cent. atropin be instilled into the eye half an hour before operation, so as to prevent the iris falling back into the anterior chamber; but Stieren finds this unnecessary if the corneal incision is small, not over 5 mm. in length. The conjunctival flap is adherent after twenty-four hours, and there is no need to keep the patient in bed after that time.

Relief of pain and enlargement of the visual field are immediate. These prompt results are ascribed equally as much to the stretching of the iris, thereby keeping open the filtration angle at this site, as to the subconjunctival drainage. Several American surgeons have adopted the operation,* and Borthen claims to have done the operation 206 times without a failure. Verhoeff uses it as a substitute for trephining, and states that he will continue to do so until he finds some objection to it, of which he is not at present aware. There appears to be only one contra-indication to the operation, and that is where the iris is so atrophic and friable that it cannot be drawn into the wound as it tears into shreds with each grasp of the iris forceps. Stieren reports six operations on four patients, and the results seem to justify the writer's advocacy of the operation.

J. JAMESON EVANS.

* *See Ophthalmoscope*, May 1916, p. 259.

(3) **Harrower, David (Worcester).—Five years' experience with iridotasis.** *Trans. Amer. Ophthal. Soc.*, Vol. XV (1917), p. 122, and *Arch. of Ophthal.*, January, 1918.

(3) Since Borthen described iridotasis in 1911, **Harrower** has performed the operation upon 23 patients, with improvement in eyes which retained vision, increase of the fields, and lowering of the intra-ocular pressure. Much abbreviated, the cases are as follows: (1) Male, aged 65. Seen in March, 1916: R.V. (corrected), 15/50; L.V. (corrected) 15/20; R.E. tension 30, and L.E. tension 57. Ordered 1 per cent. pilocarpin. In February, 1917, iridotasis. May, 1917: R.V. 15/40 and tension 22; L.V. 15/20 and tension 25. (2) Male, aged 61. November, 1916: R.V. (corrected) 15/200; L.V. 15/50. Pilocarpin. March, 1917: iridotasis on R.E. April, 1917: iridotasis on L.E. May, 1917: R.V. (corrected) 15/100, tension 25; L.V. 15/50, tension 25. (3) Male, aged 67. L.E. simple glaucoma, tension 70. October iridotasis. End-result, tension 10. No note of vision or of field. In the present communication he reports details of the three cases as typical of all he has so far operated upon.

Method of operation as follows.—Atropin (1 per cent.) fifteen minutes before operation. Eye anaesthetised with 4 per cent. cocain. Incision, about 10 mm., from cornea through conjunctival and subconjunctival tissue down to sclera. Separation of tissues to sclero-corneal junction, using inverted scissors for the purpose. Incision, about 4 mm. in length, just behind sclero-corneal margin. Pupillary edge of iris seized with forceps, and iris withdrawn into scleral opening. Conjunctiva smoothed back into place. Borthen's view is that extra-ocular filtration is only one of the factors involved in the reduction of tension by his operation. He attaches more importance to the traction exercised upon the iris, and its consequences.

S. S.

(4) **Roy, Dunbar (Atlanta).—Late infection following an operation of iridotasis for chronic glaucoma. Enucleation.** *Ibidem*, p. 126, and *Arch. of Ophthal.*, January, 1918.

(4) **Roy** reports the first instance of late infection following the operation of iridotasis. Almost five years after the operation one eye was affected with panophthalmitis, and removed. The specimen was examined by Verhoeff, and the pathological diagnosis was, "Iridotasis, with late infection with pneumococci. Advanced purulent endophthalmitis." The illustration which accompanies the communication shows that the lens is subluxated, but curiously this fact is not mentioned in the pathological report. Roy very candidly states that he made two operative mistakes which may have led to the bad result, namely (1) no suture was used to the

conjunctiva, and (2) too wide an opening was made before inserting the iris forceps. S. S.

III.—Enucleation, etc.

(1) **Weigelin, S. (Stuttgart). — Enucleation or evisceration with the formation of special sockets in war injuries? (Enukleation oder Exenteration mit besondere Stumpfbildung bei Kriegsverletzungen?)** *Klin. Monatsbl. f. Augenheilk.*, September-October, 1917.

(1) **Weigelin** is convinced that any of the fanciful methods of formation of stumps by such methods as grafting of cartilage, etc., as well as exenteration, are not advisable in war injuries. In his experience at the Tübingen war hospital he has seen such stumps give considerable trouble and has had to remove them. Moreover, even when successful, a longer stay in hospital is necessary and the ultimate result is not so superior to that of the ordinary operation.

As regards evisceration, he gives notes of one case in which sympathetic disease followed. The remains of the globe contained a considerable amount of uveal tissue. He has also found that even satisfactory evisceration stumps frequently give trouble later and do not tolerate an artificial eye. They then have to be removed. He considers that the cosmetic result of the safer and simpler operation of enucleation is little, if at all, inferior to that obtainable by the more complicated methods that have been advocated. E. E. H.

(2) **Duverger (Paris).—Resection of the anterior segment as an immediate method of treatment of war-wounds of the eyeball. (La Résection du segment antérieur comme traitement d'urgence des plaies de guerre du globe.)** *Arch. d'Ophtal.*, November-December, 1917.

(2) **Duverger** strongly advocates this method in cases of bullet or shell wounds of the eyeball which can be dealt with immediately or shortly after the injury. In many such wounds there is no hope of recovery of sight, and although vision is lost the globe is not wholly destroyed; the lesions, too severe to permit conservation of the organ, are yet limited to the anterior segment. To such cases Duverger applies the surgical rules which govern the treatment of other regions, viz.: immediate intervention, resection of all the wounded tissue and retention of all undamaged tissue.

In 150 cases of penetrating wounds of the eyeball, he has adopted this procedure 24 times, compared with 10 enucleations and 7 eviscerations. All his cases were operated on within 48 hours of the infliction of the wound.

Local anaesthesia was employed in all except one case by means of novocain, usually preceded by an injection of morphia.

The scleral section should be not less than half a centimetre posterior to the limbus. It is generally made entirely with scissors, the existence of a perforating wound rendering this possible.

Two sets of sutures are employed, fine catgut to unite the edges of the sclera, silk stitches in the conjunctiva. The latter are removed about the fourth day.

A rigorous asepsis is indispensable; the writer hesitates to emphasize this, but adds, "*tout le monde admet l'asepsie si peu respectée dans la pratique.*"

Contra-indications to the performance of this operation are, general infection of the eyeball, very extensive laceration of the coats, the presence of an intra-ocular foreign body which cannot be extracted before or during operation.

In all Duverger's cases, healing was complete from the eighth to the twelfth day and except when detained by other wounds, the men were discharged on the twelfth day. As is well known, the resulting stump after such an operation is the best possible.

Accompanying the paper are clinical notes of twenty cases; in the remainder, four in number, no written record could be obtained.

J. B. LAWFORD.

Lacrymal Operations

Calderaro, Prof.—The extirpation of the lacrymal gland. A clinical, anatomical and bacteriological research. (Sull' estirpazione delle ghiandole lacrimali, ricerche cliniche, anatomiche e bacteriologiche.) *Ann. di Ottal. e Clin. Ocul.*, January, 1917.

Calderaro discusses the question of removal, partial or complete, of the lacrymal gland in cases of persistent epiphora following removal of the sac. He describes eight cases in which he has performed the operation, and gives an account of the anatomy of the removed glands and the subsequent condition of the ocular secretion from chemical and bacteriological points of view. This description is long and does not lend itself to abstraction. He comes to the following conclusions:—

"1. Abundant and continuous epiphora, persisting after destruction of the lacrymal drainage system, in the majority of cases, depends on an abnormal hypersecretion of the lacrymal glands.

2. That disturbance ceases with the ablation of the orbital portion of the lacrymal gland, and, with still more certainty, after the removal of the palpebral portion.

3. The latter operation, an easier and more rapid one to perform, is always more efficacious, since, owing to the destruction of the excretory ducts, it at the same time suppresses the function of the orbital portion.

4. The lubricating liquid of the conjunctiva, after the extirpation of one of the two glands just mentioned, remains alkaline from the presence of chlorides; it contains traces of albumen.

5. Since the removal of the orbital gland reduces the lacrymal secretion to lower than the physiological normal, we are forced to admit that the function of the gland consists, although only to a small extent, in the continual lubrication of the conjunctiva apart from any abnormal stimuli.

6. After removal of the orbital gland there is a period of two to six days during which the conjunctiva is not at all, or only very sparingly, lubricated; the condition then improves and the moisture becomes sufficient to keep the conjunctiva in its normal condition. The quantity of the lacrymal secretion can then be diminished by the instillation of cocain, and increased by local or reflex stimuli; but that increase is always less than can be produced by similar stimuli under normal conditions.

7. The removal of the palpebral portion of the gland produces an abrupt disappearance of the lacrymal secretion owing to the simultaneous suppression of the contribution from the orbital portion. There is then a period of about ten days, during which the lubrication of the conjunctiva is absent, which structure thus becomes xerotic; if the conjunctiva is in a healthy condition the lubrication slowly improves owing to a hypersecretion of the sub-conjunctival glands. This hypersecretion also responds to cocain and local or reflex stimuli.

8. Lacrymation in weeping is much diminished after removal of the orbital gland and completely absent after removal of the palpebral portion.

9. In inveterate trachoma alterations in the structure of the sub-conjunctival glands are always present, frequently leading to their atrophy and complete destruction; in such a case removal of the orbital gland, and still more of the palpebral one, exposes the eye to the risks of atrophic xerosis of the conjunctiva.

10. The microbic content of the conjunctiva, in the case of abundant epiphora following removal of the sac, even after prolonged bandaging, is very scanty and inactive; on the other hand, after removal of one of the two lacrymal glands the microbic content, specially of pathogenic organisms, is increased (hence the frequency of various forms of conjunctivitis in this connection).

11. When the conjunctiva is affected with trachoma the microbic increase is still greater, so much so as to compromise the integrity of the cornea.

12. Ablation of the palpebral gland can be done with impunity if the conjunctiva is normal; it is always contraindicated in extensive and deep forms of cicatricial degeneration of the conjunctiva (trachoma, etc.); in such cases surgery should be confined to destruction of the lacrymal drainage apparatus as opposed to such conservative measures as probing or Toti's operation." E. E. H.

BOOK NOTICE

Medical Ophthalmology. By ARNOLD KNAPP, M.D. London: William Heinemann. 1918.

This volume of the International System of Ophthalmic Practice is one which will appeal both to the physician and ophthalmic surgeon. Written by an ophthalmic surgeon, it impresses one with the wide medical outlook and interest of the author and his extensive knowledge of diseased conditions with which ocular and ophthalmoscopic changes are associated. The plan of the book is simple, but comprehensive. It consists of fifteen sections, of which the first is an important one, dealing exhaustively with the anatomy and physiology of the structures related to vision. The other sections deal with different classes of disease in which ocular and visual changes occur: diseases of the nervous system, of glands with internal secretion (thyroid and pituitary), infectious diseases, diseases of the heart and circulation, respiratory and digestive diseases, anaemia, renal disease and diabetes, poisons, skin and bone diseases, female diseases, and hereditary eye conditions. It will be seen that little has escaped the fine-meshed net of the author; indeed one is occasionally somewhat overwhelmed by the wealth of detail, especially statistical detail. But reading it, as the writer has done, in a somewhat discursive yet critical fashion, is scarcely the way to do it justice, or to appreciate properly its value. It is really a valuable book of reference, in which will be found succinctly yet clearly set out all the varied information obtainable on the subject about which it is consulted. Occasionally one comes across a somewhat dogmatic statement of which a contradiction is found later. Thus on p. 169 it is stated "every primary atrophy is now considered a symptom of tabes or paresis," and yet on p. 214 it is quite correctly stated, in reference to ophthalmoscopic changes in chiasmal tumour that "simple optic atrophy is the most frequent." A misspelling also is sometimes met with, e.g. "Jessup" for "Jessop," and "Stevenson" for "Stephenson." But these are

really small matters and do not seriously detract from the value of a work which is remarkable for the wide range of its author's knowledge and the gift of exposition which has enabled him to utilize that knowledge for the benefit of others.

JAMES TAYLOR.

OBITUARY

The many friends of Charles Devereux Marshall will learn with deep regret of his death from cholera at the Colaba War Hospital, Bombay, on September 14 last at the early age of 50 years. In

civil life he practised in Harley Street, London, and occupied the positions of surgeon to the Royal London Ophthalmic Hospital (where he had been assistant surgeon, curator and librarian, house surgeon, and clinical assistant), and of ophthalmic surgeon to the Victoria Hospital for Children at Chelsea.

Born at Southsea, he was the younger son of the late William

Marshall, solicitor. He received his medical education at University College, London. He was deeply interested in naval affairs, and was surgeon to the Royal Naval Volunteer Reserve. Upon the outbreak of hostilities he lost not a moment in joining up, and since then took part in many stirring experiences. He first joined H.M.S. *Euryalus*, at Chatham, and on board that ship was present at the battle of Heligoland Bight. In 1915 he was present at the landing at Suvla Bay, and served throughout the Gallipoli operations until the evacuation. During those operations he was once on the " River Clyde " attending to wounded, and on the way back to the *Euryalus* the pinnace got lost and dared not move in the darkness. Marshall and the men in the boat were exposed to machine-gun fire for several hours. Marshall next saw service in the East Indies and then found his way to Mesopotamia, where he went to Baghdad in a river gunboat. At the time of his death he was attached to H.M.S. *Dalhousie*. Always a man of devout mind he formally joined the Church of Rome about a year before his death. Marshall was the soul of honour, utterly incapable of a mean thought or a paltry action: simplicity, modesty, and sincerity were striking features of his character. He was a skilled exponent of the science and art of ophthalmology, and excelled in the operative part of his work. He was a prolific writer, and many of his contributions, especially those of a pathological nature, were published in the *Royal London Ophthalmic Hospital Reports* and in the *Transactions* of the Ophthalmological Society. He was sub-editor of the *Ophthalmoscope* during the first seven years of the existence of that periodical. In 1912 he published " Diseases of the Eyes," one of the best of the smaller works. He was a prominent member of the Ophthalmological Society of the United Kingdom, and was secretary of the Society during the period 1904-7. It should be mentioned, finally, that Marshall was secretary of the Section of Ophthalmology at the annual meeting of the British Medical Association at Ipswich in 1900 and vice-president at the Sheffield meeting eight years later. He was unmarried.

Mr. A. Stanford Morton sends the following:

The chief characteristics of Devereux Marshall, which to my mind stand out pre-eminently, are (1) his absolute and transparent honesty, which abhorred anything suggestive of subterfuge or underhand dealings; (2) his cheery, hearty good nature, ever ready to lend any and all assistance which lay in his power, regardless of any inconvenience which it might cost him; (3) the extreme energy displayed in whatever he undertook, thus enabling him to get through an enormous amount of good work, mental and physical, in an incredibly short time, and that in spite of his having undergone an operation for gastro-enterostomy. Lastly, what may not have

been generally known, but was very obvious to those who knew him best, his deeply religious nature.

I was closely associated with him in the greater part of his career, both at Moorfields and in private, for he assisted me in practically all my operations, and carried on my practice in holiday time; and he always seemed to me to be as courteous, considerate, and kind to the poor as to the wealthy, and there are still patients who always enquire kindly regarding him, though in some cases many years have elapsed since he attended to them.

As illustrative of his operative skill, even under perturbing circumstances, I should like just to mention a small episode which occurred when he was assistant surgeon on my days at Moorfields and I had handed over to him a left-handed cataract for removal.

Just as he was about to commence, one of the consulting surgeons appeared on the scene, and Marshall quietly suggested that perhaps I had better do the operation. I said: "No, go on with it yourself and open the capsule with the knife as you traverse the a.c." In spite of the close and critical observation of the surgeon, Marshall executed this delicate operation with such dexterity that, as soon as the cataract was delivered, the observer enquired how he had managed to remove the lens without having lacerated the capsule,and appeared almost incredulous when Marshall explained what he had done.

The following appreciation has been contributed by Dr. Sydney Russell Wells:

In Marshall's student days, perhaps, the characteristic which most struck his fellow students was his quiet, unassuming manner, bordering on shyness; but, even then, it was generally recognized that, beneath this gentle exterior, there was a strong personality, and that he was a man of deep convictions, a steadfast friend, and singularly unselfish. One who knew him intimately says that the word "sincerity" best sums up Marshall's character. Whether in his work or amusements, he threw himself heart and soul into the matter on hand. Possibly as the result of his boyhood having been spent in a great Naval centre, he was passionately attached to the sea. He was a fine swimmer and an enthusiastic yachtsman: mere sailing was not enough for him, he was as sincere in his seamanship as in his professional work. Whether it was knotting and splicing, scrubbing down, and the seaman's care for every detail of his ship, or whether it was the scientific study of navigation and the history and literary side of the sea, he was equally enthusiastic and thorough. He sailed many thousand miles round our coasts, and never left his yacht before completing the log for the day. Arising, no doubt, from the needs of his boats, he developed, during the last few years, a great interest and aptitude in mechanical pursuits, and became an expert at the lathe, with

the chisel and the file. Here, again, the work of the amateur "botcher" was not good enough for him. He was essentially English, and had no small share of that doggedness and deep underlying patriotism and idealism which is rarely flaunted abroad, and which has been supposed by some to characterize our race. It is therefore not surprising, with his love for the sea, that he should have been an enthusiastic member of the Naval Volunteer Reserve. For some years he served as a combatant officer in the force, but shortly before the war, on account of the exigencies of his practice, he found it necessary to curtail the time he was devoting to this work, and so accepted a commission as surgeon in the R.N.V.R. Hence, when war was declared he was called up for service. After serving in the North Sea, and being present at the battle of the Heligoland Bight, he took part in the landing at Sulva Bay and in the operations at the Gallipoli Peninsula. Later, he was ordered to the Persian Gulf. He took part in some of the operations in Mesopotamia, went up the Tigris as far as Baghdad, evacuated many of the wounded from Kut, and latterly was on duty at Bombay, where his skill as an ophthalmic surgeon was of the greatest service to our troops in the East. The fact that he was finally appointed P.M.O. to the Naval Forces in the Persian Gulf, a distinction which he highly appreciated, shows he threw himself heart and soul into his work, and that his devotion and ability were recognized by those in command.

No account of Devereux Marshall would be complete without some reference to his deep religious convictions. He took an active interest in the Guild of St. Luke, and was largely instrumental in instituting the medical services of St. Paul's Cathedral. Here, again, the sincerity and quiet, unassuming characteristics of the man were well-marked; although those who knew him realized what a profound influence his religious beliefs had upon his life, he never obtruded them, nor endeavoured to force his views on unwilling listeners. His death will cause a gap to those who had the privilege of his acquaintance which it will be impossible to fill, for his intimates had a respect and affection for him that few are able to inspire.

Henry Beale Collins, for twenty-five years medical officer of health at Kingston-on-Thames, died recently. His contributions to medical literature included a paper on "Noah's Ark Test Types," which appeared in 1908.

The death from wounds, on May 6, 1918, took place of Staff-Surgeon J. Flemming, aged 44 years. He had studied at the Berlin Charité under Greeff and was known from his work on trachoma bodies and on the curative action of radium and mesothorium in eye diseases.